

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property  
Organization  
International Bureau



(43) International Publication Date  
22 April 2004 (22.04.2004)

PCT

(10) International Publication Number  
**WO 2004/034373 A3**

(51) International Patent Classification<sup>7</sup>: **G09G 5/00**,  
G01S 13/02, G01C 23/00

**BRAASCH, Michael** [US/US]; 27 Meadow Lane, Athens,  
OH 45701 (US).

(21) International Application Number:  
PCT/US2003/032306

(74) Agent: **LECH, Robert, R.**; Calfee, Halter & Griswold  
LLP, 21 East State Street, Suite 1100, Columbus, OH  
43215-4243 (US).

(22) International Filing Date: 9 October 2003 (09.10.2003)

(81) Designated States (*national*): CA, JP, US.

(25) Filing Language: English

(84) Designated States (*regional*): European patent (AT, BE,  
BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU,  
IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR).

(26) Publication Language: English

(30) Priority Data:  
60/417,388 9 October 2002 (09.10.2002) US

Published:  
— with international search report

(71) Applicant (*for all designated States except US*): **OHIO  
UNIVERSITY** [US/US]; 20 East Circle Drive, Suite 190,  
Athens, OH 45701-3751 (US).

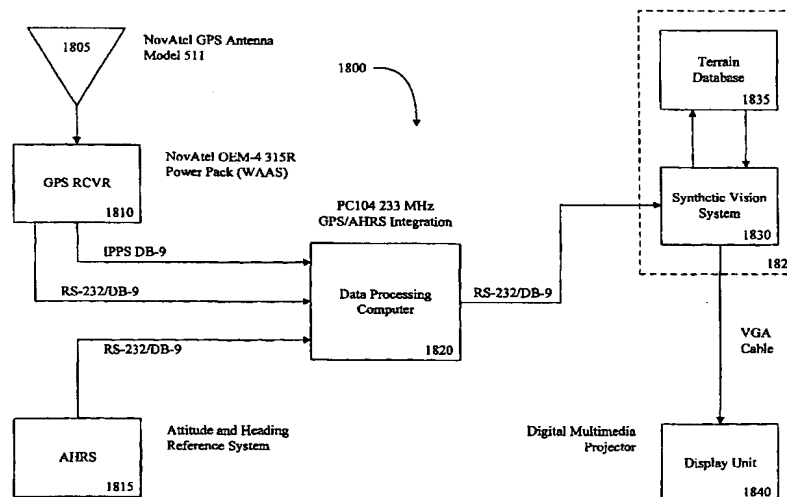
(88) Date of publication of the international search report:  
24 June 2004

(72) Inventors; and

(75) Inventors/Applicants (*for US only*): **BURCH, Douglas**  
[US/US]; 612 O'Neal Street, Belpre, OH 45714 (US).

*For two-letter codes and other abbreviations, refer to the "Guid-  
ance Notes on Codes and Abbreviations" appearing at the begin-  
ning of each regular issue of the PCT Gazette.*

(54) Title: MULTI-VIEW HEAD-UP SYNTHETIC VISION DISPLAY SYSTEM



(57) Abstract: Systems and methods for providing an enhanced head up display to an aircraft pilot are disclosed. According to a first aspect of the present invention, a system for increasing pilot situational awareness is disclosed. The system (1800) includes a navigational component (1805, 1810, 1815) that determines one or more of an aircraft location and attitude. The system (1800) also includes a scene generator (1835) that produces one or more virtual images of the space into which the aircraft is flying based, at least in part, on the aircraft location and/or attitude. The system (1800) further includes one or more head up displays (1840) that display the one or more virtual images to facilitate increasing pilot situational awareness. Other systems and methods for providing an enhanced head up display are also disclosed.

# INTERNATIONAL SEARCH REPORT

International application No.

PCT/US03/32306

## A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) : G09G 5/00; G01S 13/02; G01C 23/00

US CL : 345/7, 8; 701/3, 4, 14;

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 345/7, 8; 701/3, 4, 14; 348/115; 349/11;

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)  
Please See Continuation Sheet

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5,654,890 A (NICOSIA et al) 05 August 1997 (05.08.1997), figure 1, column 3, lines 35 through column 4, line 29, column 9, lines 48-63, and column 10, lines 13-16.	1 and 2
X	US 6,381,519 B1 (SNYDER) 30 April 2002 (30.04.2002), figures 1 and 3, abstract, column 3, lines 28-64, column 4, line 32 through column 5, line 7.	1-3

☐ Further documents are listed in the continuation of Box C.

☐ See patent family annex.

\* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T"

later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X"

document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y"

document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&"

document member of the same patent family

Date of the actual completion of the international search

04 March 2004 (04.03.2004)

Date of mailing of the international search report

25 MAR 2004

Name and mailing address of the ISA/US

Mail Stop PCT, Attn: ISA/US  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, Virginia 22313-1450

Facsimile No. (703)305-3230

Authorized officer

Jimmy H. Nguyen

Telephone No. (703) 306-5422

# INTERNATIONAL SEARCH REPORT

PCT/US03/32306

## Continuation of B. FIELDS SEARCHED Item 3:

EAST; Data Bases: USPAT, US-PGPUB, DERWENT, EPO, JPO and IBM TDB; Search Terms: head up display, determining aircraft location or aircraft position and aircraft attitude, image generator, navigation, virtual image, awareness, a plurality of head up displays.